











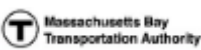














# California Energy Commission April 23, 2014

*This presentation is incomplete without the accompanying oral discussion.*

# Massachusetts FCEV Working Group

<i>Industry</i>	<i>State &amp; Federal</i>	<i>Fleets</i>	<i>Automakers</i>
        	      	     	   

## Station Funding Program

1. Size the fleet to match the output of a 50 kg/day H<sub>2</sub> station (18-50 cars).
2. Establish a Hydrogen Purchase Agreement (HPA) between the fleet owner and the station operator.
3. Station operator, using the HPA as collateral, uses 3<sup>rd</sup> party funding for his CAPEX in the same way the solar industry used PPA's.

**H<sub>2</sub> Site Generation Industry Response** – station makers each confirmed the HPA process allows them to fund stations - Nuvera Fuel Cells, Giner, Angstrom Advanced (Verde) and Nanoptek.

**Timing** - Gain 3 to 5 Fleet Commitments by end of 2014 – Expect Delivery by End of 2015.

**Transition from fleet to retail by end of 2015** - Reduce % HPA reliance at H<sub>2</sub> stations to free capacity for retail use in phases – 30% reduction then 50% reduction to 75% to zero.

# H2 Station Utilization Programs Blend Fleet/Retail

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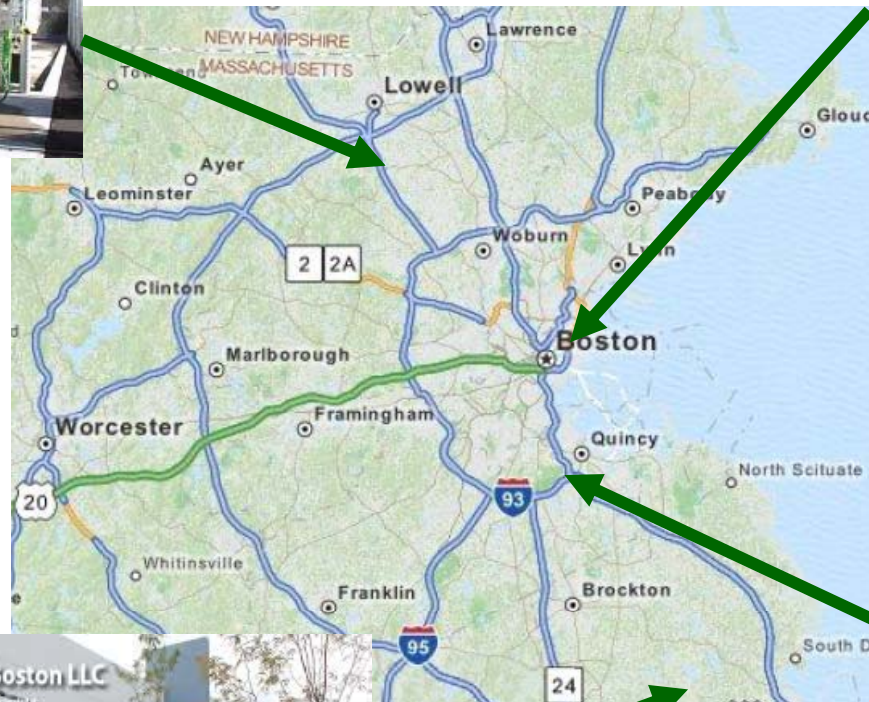


- **Bus, Commuter.** One bus equals one 50 kg H2 station. Consortium - Logan International Airport (operated by Massport), the operator of Framingham Logan Express, and an FCEV integrator.
- **Ground Support Equipment (FC Powered).** To compliment demand for hydrogen negotiate with Logan and Airlines to convert baggage tugs to FCEV.
- **Medium Duty Delivery Fleet FC Range Extender Hybrid.** A major retailer has agreed to explore conditional order for 20 units subject to performance of one.
- **Bus, Mass Transit.** MTBA Nuvera FC bus not due until end of 2014. Use that experience to expand FC Mass Transit Bus population in state starting in 2015.
- **Bus, Regional Transit.** A Regional Transit Authority is moving to CNG over the next several months. They have expressed interest in FC Battery Electric Hybrids and are interested in creating a shared fueling station that supports a retail FCEV program.

# Massachusetts Hydrogen Fueling Stations



Nuvera, Billerica,  
MA  
In Operation Now,  
Fueling 2 Toyota  
Highlanders,



**T** Massachusetts Bay  
Transportation Authority  
MTBA Charlestown,  
MA  
1 FC Bus, Delivery  
In Late 2014

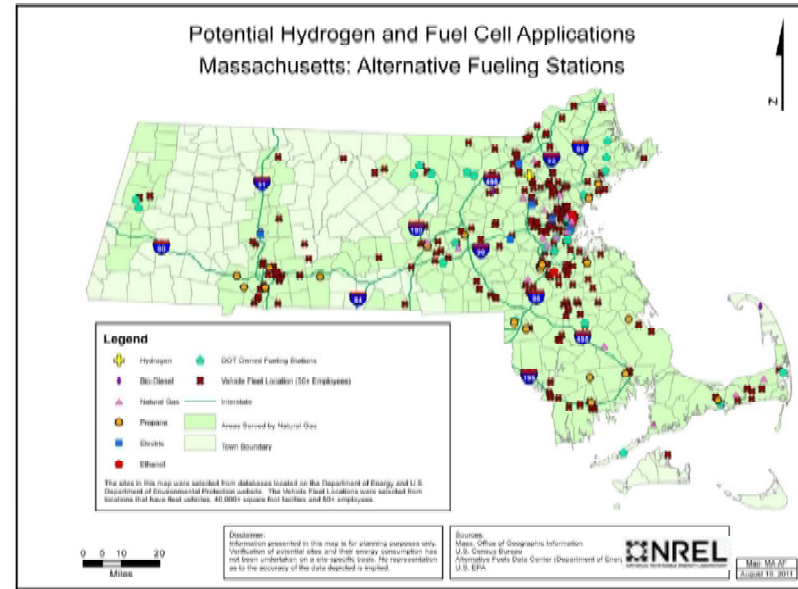
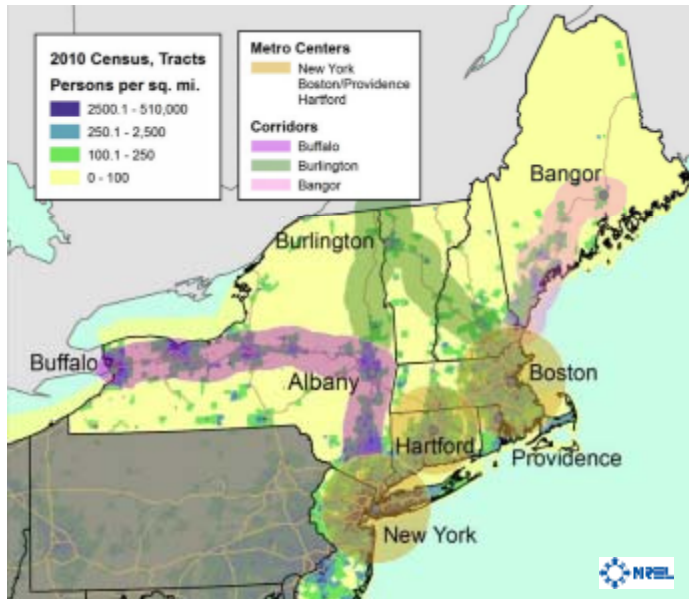
SYSCO, Plympton,  
MA  
Distribution Center  
relies “only” on FC  
powered fork lifts.  
Over 230 are on  
site.



Proton OnSite,  
Braintree, MA  
Mid 2014 Start Up



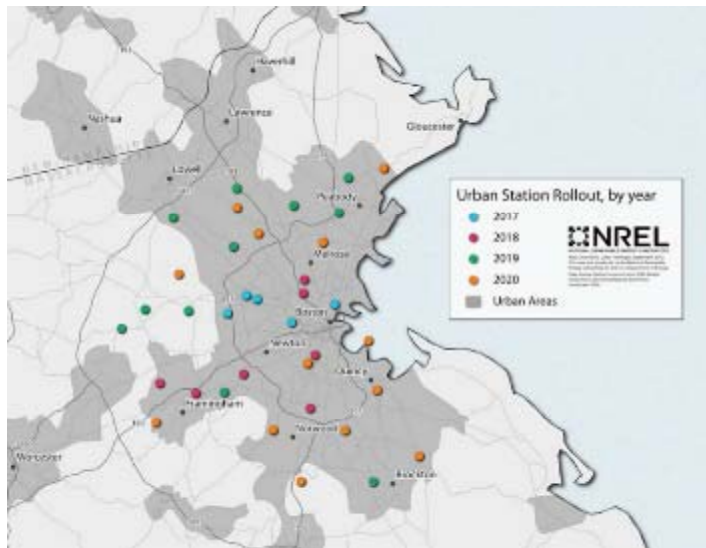
# Concept Refueling Roadmaps



Top left map - basic northeast corridors in need of H2 infrastructure coverage.

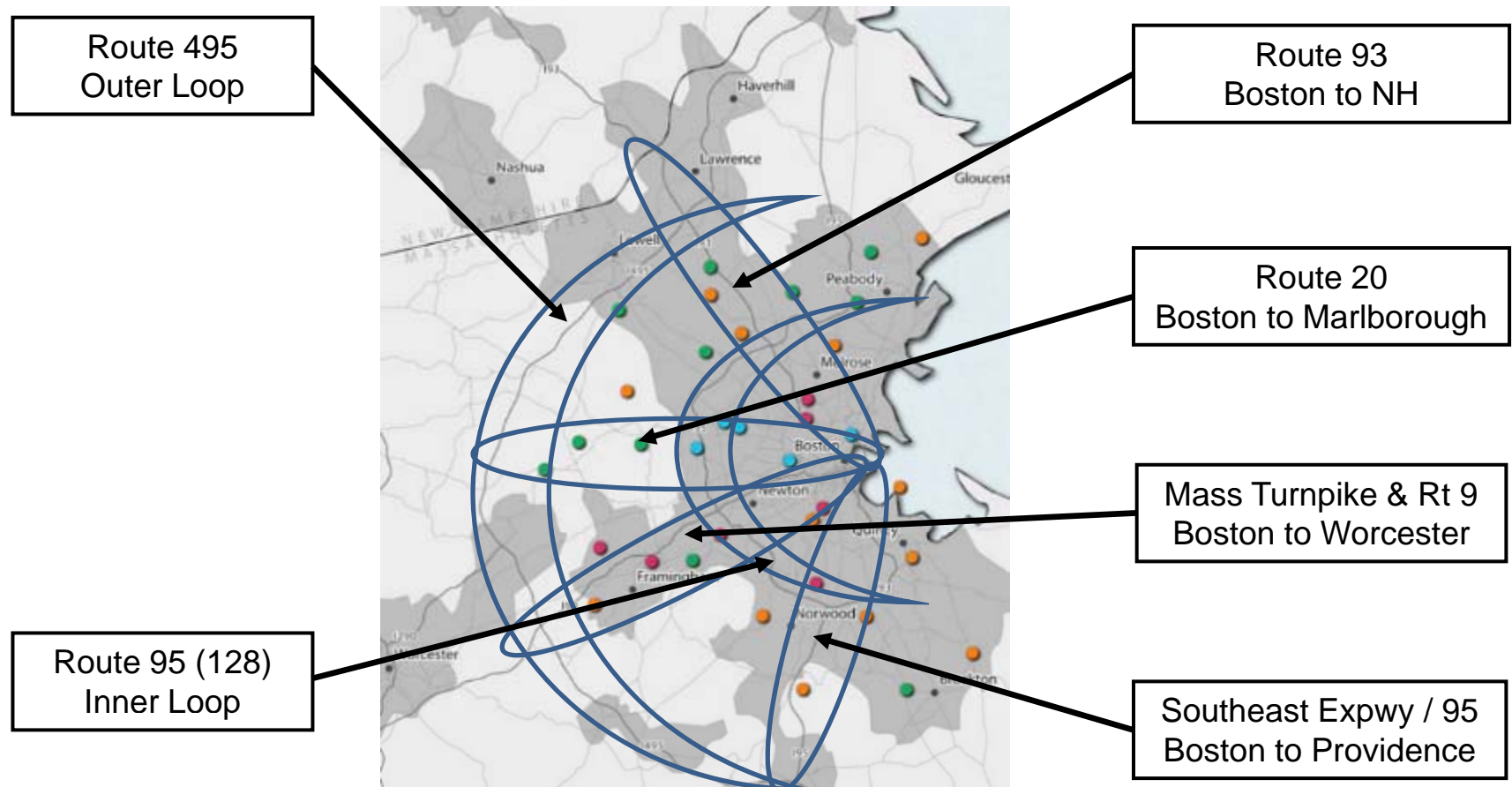
Top right map – an early rendition of station locations to meet a 2020 vehicle population.

Lower left map - an example of what a phased station location plan might be for the initial launch years of the greater Boston FCEV market. Years will be restated and start at 2015.



# Greater Boston Concept

## 4 Spokes – 2 Loops



# Summary

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## **Transition – Fleet to Retail**

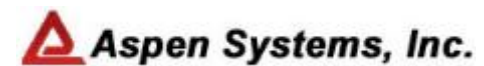
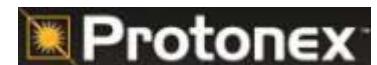
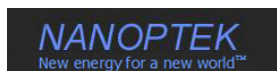
- 2014 start fleet / HPA program commitments for delivery in second half of 2015.
- October 2015 and running parallel to the fleet sales program, the launch retail consumer FCEV sales program.
- Reduce % HPA reliance at H2 stations to free capacity for retail use in phases – 30% reduction of reliance on fleet use, then 50% reduction to zero.

## **Moving Forward – Short Term**

- Facilitation discussions that size a fleet to match the specific hydrogen output of a station (2014 station size ~50 kg/day) and negotiations between the automakers, station operators and H2 fueling suppliers.
- Massachusetts Electric Vehicle Initiative Task Force (MEVI) will offer ZEV rebates and other purchase incentives.
- Create a pooling of smaller fleets in close proximity into a central H2 fueling site using a modified HPA agreement allowing for multiple fleet users.
- Add connector stations to other regions using Sturbridge and Lee.

# Massachusetts Hydrogen Coalition

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